
Derivation conditions impact X-inactivation status in female human induced pluripotent stem cells.

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Public Summary:

Scientific Abstract:

Female human induced pluripotent stem cell (hiPSC) lines exhibit variability in X-inactivation status. The majority of hiPSC lines maintain one transcriptionally active X (Xa) and one inactive X (Xi) chromosome from donor cells. However, at low frequency, hiPSC lines with two Xas are produced, suggesting that epigenetic alterations of the Xi occur sporadically during reprogramming. We show here that X-inactivation status in female hiPSC lines depends on derivation conditions. hiPSC lines generated by the Kyoto method (retroviral or episomal reprogramming), which uses leukemia inhibitory factor (LIF)-expressing SNL feeders, frequently had two Xas. Early passage Xa/Xi hiPSC lines generated on non-SNL feeders were converted into Xa/Xa hiPSC lines after several passages on SNL feeders, and supplementation with recombinant LIF caused reactivation of some of X-linked genes. Thus, feeders are a significant factor affecting X-inactivation status. The efficient production of Xa/Xa hiPSC lines provides unprecedented opportunities to understand human X-reactivation and -inactivation.

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